RUBELLA SCREENING PROGRAMME—PRELIMINARY RESULTS IN NORTHERN IRELAND

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IT is well known that rubella infection occurring during the first four months in pregnancy is associated with a high incidence of congenital abnormalities in the foetus.[1] In Northern Ireland it is considered that an average of eight handicapped infants are born annually as a result of rubella.[2] In order to prevent this problem, routine immunisation of 11-14 year old girls was introduced in 1971 in Northern Ireland following a DHSS recommendation.[3] However, this programme has not been entirely effective and vaccination uptake in schoolgirls has fallen from 90 per cent during the years 1971-73 to 65 per cent during 1975-77. Furthermore, it has become clear that a substantial proportion of pregnant women who would have qualified for rubella immunisation as schoolgirls are not immune.

A Department of Health and Social Services (DHSS) working party report (1976) recommended that adult women should be screened for rubella antibody so that non-immune women could be identified and with certain safeguards offered immunisation.[4] In 1979 the DHSS (N.I.) urged renewed efforts to increase the uptake of vaccine in all groups. Accordingly a serological screening service was introduced and this was sited at the Northern Ireland Blood Transfusion Service which was already receiving blood samples from all ante-natal patients in the province. It was decided that ante-natal patients should be screened and immunisation offered to those who were found to be non-immune during the post-partum period. As the vaccine is a live virus which could, at least theoretically, have teratogenic effects, it is considered important to ensure that pregnancy is avoided for at least three months following immunisation.

The policy has obvious disadvantages in that protection can never be provided for the pregnancy during which non-immunity is discovered. In addition it was advised that other groups should be screened, e.g. pre-menopausal blood donors, women attending family planning and infertility clinics and certain occupational groups at particular risk of contacting rubella such as nurses and teachers. We wish to report on three aspects of this programme: (1) the incidence of non-immunity among women in the child-bearing age group, (2) certain factors influencing immune status, (3) the success of the programme to date as judged by sero-conversion rates at follow-up.

POPULATION AND METHODS

It was considered useful to divide the population to be screened into three groups: ante-natal patients, blood donors and specific requests. Blood samples are received routinely for other purposes from all ante-natal patients and blood donors and so it was of interest to consider the success of immunisation in these two groups (95 per cent of total) for whom no requests for specific rubella screening had been made.

The levels of rubella antibody are quantitated using the single radial haemolysis (S.R.H.) test. This has been an important development which is not only more reliable than the previously used haemoglutination inhibition test but is also much less time consuming and therefore suitable for mass screening.[5] One slight disadvantage is its failure to detect IgM antibodies and it is therefore of no value in the diagnosis of acute infections. It is widely considered at present that immunisation should be offered to those with antibody levels below 15 iu/ml. Women with antibody levels below this are reported as either negative or low immunity (< 15 iu/ml). In the case of ante-natal patients reports are sent to the ante-natal clinic or general practitioner providing the sample, whereas blood donors are informed personally by means of an explanatory letter.

It was decided to analyse the correlation, if any, between immunity to rubella and recollection of previous infection and recollection of previous immunisation. It was thought that the results might provide some useful information regarding the selection of women for screening, e.g. a positive recollection may influence the patient and possibly their doctor as to the need for immunisation. Accordingly, a questionaire was conducted among 2,718 female blood donors who qualified for a screening test (aged under 45 years). These donors were asked questions from a standard form about their recollection of previous infections or immunisation. The answers were correlated with the immune status of the subjects concerned.

Files are kept on all individuals requiring immunisation so that it is possible to monitor the success of the programme as judged by the proportion who have become immune on follow-up testing, e.g. subsequent pregnancies. The immune status of blood donors is marked on the donor cards and non-immune women are re-tested at subsequent donations.

RESULTS

Approximately 45,000 tests per annum have been performed since April 1979 of which about 80 per cent were ante-natal samples. The incidence of non-immune subjects has varied little during this period having been approximately 9 per cent during 1979 (5 per cent negative and 4 per cent low immunity) and has dropped to 7.5 per cent during 1981. The 160 non-immune subjects among the 2,718 female blood donors were analysed with regard to factors associated with immunity. As many as 37 (20 per cent) gave a positive history of German measles, whereas 29 per cent of immune subjects gave a history of German measles. Questioned about rubella immunisation, 37 of 160 non-immune subjects (23 per cent) had a positive recollection and 36.5 per cent of immune subjects had the same recollection. Similar data are not available for ante-natal patients.

Many of the women tested during the ante-natal period have now had further pregnancies and an analysis of a random sample of 128 of these subjects who were non-immune during a previous pregnancy has shown that only 28 (21 per cent) have acquired adequate immunity in the interval since their previous pregnancy. Follow-up data on 1,355 blood donors found to be non-immune showed that 278 (20.5 per cent) had become immune at the time of subsequent blood donation. It should be noted that the rubella epidemic of 1980 took place during the follow-up period for most of the ante-natal patients and blood donors.

DISCUSSION

Our data show that during 1979 approximately 9 per cent of women became pregnant without adequate protection against rubella. This figure has fallen to 7.5 per cent during 1981. This slight reduction may reflect an improvement in immunisation uptake but the rubella epidemic in 1980 may also have played a part. These figures are better than most others recorded recently from the United Kingdom which vary from 8 to 15 per cent.[6, 7, 8]

Our questionaire of blood donors revealed that a substantial proportion of non-immune subjects gave a history of German measles (23 per cent). This is perhaps not surprising in view of the notorious difficulty in making a clinical diagnosis of German measles. Similarly, 23 per cent of non-immune subjects said they recalled having rubella immunisation. Two factors may explain this discrepancy: (1) an erroneous history which is understandable in that rubella immunisation could well have been confused with B.C.G. vaccination and (2) failure of the vaccine to cause seroconversion or failure of antibody levels to be maintained. The latter seems a less likely cause as various studies have shown seroconversion rates of 95-99 per cent.[8, 9] Furthermore duration of immunity, although still unknown, appears to be at least 10 years in the majority of people.[10] These findings strongly indicate that an oral history from patients of German measles infection or immunisation should be disregarded when deciding about the need for a screening test, and this is in keeping with another study.[7]

So far our follow-up records on ante-natal patients indicate that the proportion of non-immune women being immunised post partum is extremely disappointing. Only 21.9 per cent of 128 women analysed have shown seroconversion on follow-up and as the available rubella vaccines have very high seroconversion rates this figure should approximate to the proportion being immunised post-partum. It may even be an overestimate as some of the seroconversions may have been due to natural infection. These results agree with another study in the same community which analysed the rate of post-partum vaccine uptake, (21.5 per cent) in women reported as non-immune during the ante-natal period.[11] It is obvious that the present method of reporting the laboratory results to the clinic or general practitioner providing the blood sample and explaining the need for immunisation has not been successful. McConnell[11] has investigated methods of improving vaccine uptake among the ante-natal patients in this community and found that one to one education about rubella during the early post partum period by a health visitor increases vaccine uptake from 21.5 per cent to 66 per cent. Such a policy is under consideration at present. The low seroconversion rates (20.5 per cent) which we have found in blood donors who were informed of the need for vaccination in person by means of an explanatory letter would seem to be slightly at odds with McConnell's findings. However, it should be remembered that apart from the different methods of communication used, blood donors differ from ante-natal patients very significantly, particularly with regard to further child-bearing intentions.

As already stated the ante-natal screening programme in isolation will always fail to provide protection for the first pregnancy and the best long-term solution to this problem is to improve vaccine uptake among schoolgirls.

SUMMARY

Since 1979 in Northern Ireland all ante-natal patients and certain other groups of females in the child-bearing age group have been screened for immunity to rubella with a view to offering immunisation to those who are non-immune. During this period the overall incidence of non-immunity has fallen from 9 per cent (1979) to 7.5 per cent (1981). The results of a questionnaire indicate that a substantial proportion of non-immune women give a history of rubella infection or immunisation indicating that such a history should be ignored when deciding about the need for a screening test. Follow-up studies indicate that the rate of post-partum vaccine uptake among women tested during the ante-natal period is very poor (approx. 20 per cent). The implications of these findings are discussed.

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